

EVALUATION OF SOUTHERN PINE BEETLE OUTBREAK ON THE
SUMTER NATIONAL FOREST, SOUTH CAROLINA

By
J. D. Ward

INTRODUCTION

Aerial and ground evaluations of southern pine beetle infestations were conducted on five districts of the Sumter National Forest during the fall and winter of 1974 (Figures 1, 2, and 3). The purpose of the evaluations was to determine the status of the outbreak and its probable course on the five districts.

The infestations on these districts are part of a South-wide outbreak invading 50 million acres, and they have been occurring for several years in all but the Edgefield District which became infested in 1974.

TECHNICAL INFORMATION

Insect - Southern pine beetle, *Dendroctonus frontalis* Zimm.

Hosts - Southern pine beetle is a native forest pest that will attack all species of southern yellow pine. However, loblolly pine, *Pinus taeda* L., and shortleaf pine, *P. echinata* Mill., are the preferred hosts.

Type of Damage - Death of the tree is the result of mining in the cambium by the southern pine beetle as it constructs egg galleries. The beetle also introduces blue stain fungi, *Ceratocystis* spp., which slow down or block conduction of water in the stem. The size of an infestation may range from a single tree to several thousand trees.

Life Cycle of the Beetle - Southern pine beetles attack in pairs and construct a winding gallery in the cambium. Eggs are deposited in niches along the sides of the galleries. The eggs hatch into whitish grubs that further mine the cambium and then construct cells in the bark where they pupate and change to adults. The new adults then mine through the bark to emerge. The complete life cycle takes about a month during the summer, and as many as four or five generations may be produced annually in the area.

METHODS

An aerial sketchmap survey was made over each district and spots of red-topped and fading pines were plotted on U. S. Forest Service district maps. Data from the aerial surveys were corrected according to Aldrich et al^{1/} and expanded to represent 100-percent coverage. A total of 34 spots of dying trees were ground checked to determine the causal agent, number of attacked trees, and condition of the beetle brood.

RESULTS AND DISCUSSION

Results of the evaluations showed moderate to high beetle populations on the five districts surveyed (Table 1). Infestations were found throughout the pine type in all districts. There is a potential for increase in beetle populations during July and August of 1975. The greatest potential for increased activity is on the Andrew Pickens District and the recently infested Edgefield District.

RECOMMENDATIONS

Where timber resources can justify suppression measures, the districts should continue to follow guidelines outlined in the 5250 section of the Forest Service Manual which are as follows:

1. Removal of Infested Trees by Commercial Sale or Administrative Use. When infested trees of merchantable size are accessible, they should be removed by commercial sale or administrative use procedures. Logging of the infested material should begin immediately. Contract time limits should insure rapid removal.

Where practical, and if host type is present, a 40- to 70-foot buffer strip should be marked and cut adjacent to and ahead of the most recently infested trees. This practice is effective in reducing the possibility of "breakouts." When only a small volume of infested merchantable material occurs in a spot, non-infested trees surrounding the spot may be marked to provide an operable cut.

The order of priority for removing beetle infested timber from a spot should be as follows:

-
- 1/ Aldrich, R. C., R. C. Heller, and W. F. Bailey. 1958. Observation limits for aerial sketchmapping southern pine beetles in the southern Appalachians. J. For. 56:200-202.

Trees having nearly developed broods (usually the red and fading trees).

Trees having young broods (usually the green, recently infested trees).

Trees in the buffer zone.

2. Piling and Burning. Unmerchantable or inaccessible southern pine beetle infestations can be suppressed by cutting, piling, and thoroughly burning the bark of infested trees. The entire bark surface must be thoroughly burned to insure effective control. The order of priority for cutting, piling, and burning infested trees, particularly the large spots, is the same as paragraph (1) under removal of infested trees by commercial sale or administrative use. Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts" every effort should be made to locate and treat all green infested trees during the piling and burning operation.
3. Chemical Control. Chemical formulation recommended for southern pine beetle control is a 1/2 percent Lindane spray with No. 2 fuel oil as the carrier. This may be formulated from a 20 percent lindane emulsifiable concentrate or oil concentrate at the rate of 11 pints of concentrate in enough fuel oil to make 55 gallons of spray. (Ratio of one part 20 percent lindane EC to 39 parts No. 2 diesel fuel).

Cut, limb, and buck all infested trees into workable lengths. Spray the infested bark surface to the point of run-off. A compressed air sprayer (3-gallon capacity or equivalent) is an ideal applicator. Infested logs must be turned two or three times to insure complete treatment of infested bark. Spray stumps and bark removed by woodpeckers. Low pressure sprayers may be used to treat large, accessible infestations.

The order of priority for cutting and spraying infested trees in large spots is the same as paragraph (1) under removal of infested trees by commercial sale or administrative use. Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts" every effort should be made to locate and treat all green infested trees during the chemical control operation.

Never spray trees from which southern pine beetle brood has emerged. Natural enemies of the southern pine beetle in these trees can then complete their development. To prevent aerial spotters from mapping treated spots, cut trees with red needles from which beetles have emerged.

Instructions for minimizing the adverse effects of mixing, transporting and storing pesticides, applying pesticides and disposing of pesticide containers and excess chemicals are outlined in section 8.3 of the Forest Service Health and Safety Code and FSM 5242.21. Detailed safety procedures should be outlined in the project suppression plan.

4. Reexamination of Treated Areas. Reexamine areas where infested trees were removed by commercial sales, piled and burned, or chemically treated within two or three weeks after treatment to check for additional infested trees. If additional trees are found, treat them.

PRECAUTIONARY PESTICIDE USE STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key -- out of the reach of children and animals -- away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Department of Agriculture, consult your county agricultural agent or State Extension specialist to be sure the intended use is still registered.

Table 1. Summary of results of southern pine beetle evaluations conducted on the Sumter National Forest, South Carolina, 1974.

	OWNERSHIP UNIT				
	Andrew Pickens R.D.	Tyger R.D.	Enoree R.D.	Long Cane R.D.	Edgefield R.D.
1. <u>Aerial Survey Data</u>					
Date of survey	:9-10-74	:9-30-74	:9-30-74	:8-30-74	:8-30-74
Survey type and % coverage	:Sketchmap-50%	:Sketchmap-100%	:Sketchmap-100%	:Sketchmap-100%	:Sketchmap-50%
Acreage surveyed	:128,741	:205,765	:194,237	:208,244	:222,756
Estimated host type	:64,370	:77,000	:110,089	:110,396	:118,090
Number of spots in survey area	:174	:67	:45	:139	:255
2. <u>Ground Truth Data</u>					
Date of ground checks	:10-4-74	:10-30-74	:10-30-74	:9-14-74	:9-14-74
Number of spots checked	:9	:4	:4	:7	:10
Number of active spots	:6	:2	:2	:3	:8
Mean No. infested trees/spot	:70	:20	:19	:23	:12
3. <u>Estimated Infestation Level</u>					
Infested trees per M acres of host type	:60	:22	:12	:21	:26
Number of infested trees in survey area	:3,832	:1,694	:1,339	:2,363	:3,121
Volume of recently killed trees (cu. ft.)	:46,228	:27,044	:28,999	:3,134	:250,157
Number of spots per M acres of host type	:2.7	:0.9	:0.4	:1.3	:1.9
Range of spot size	:1-300	:1-300	:1-300	:1-150	:1-2,400

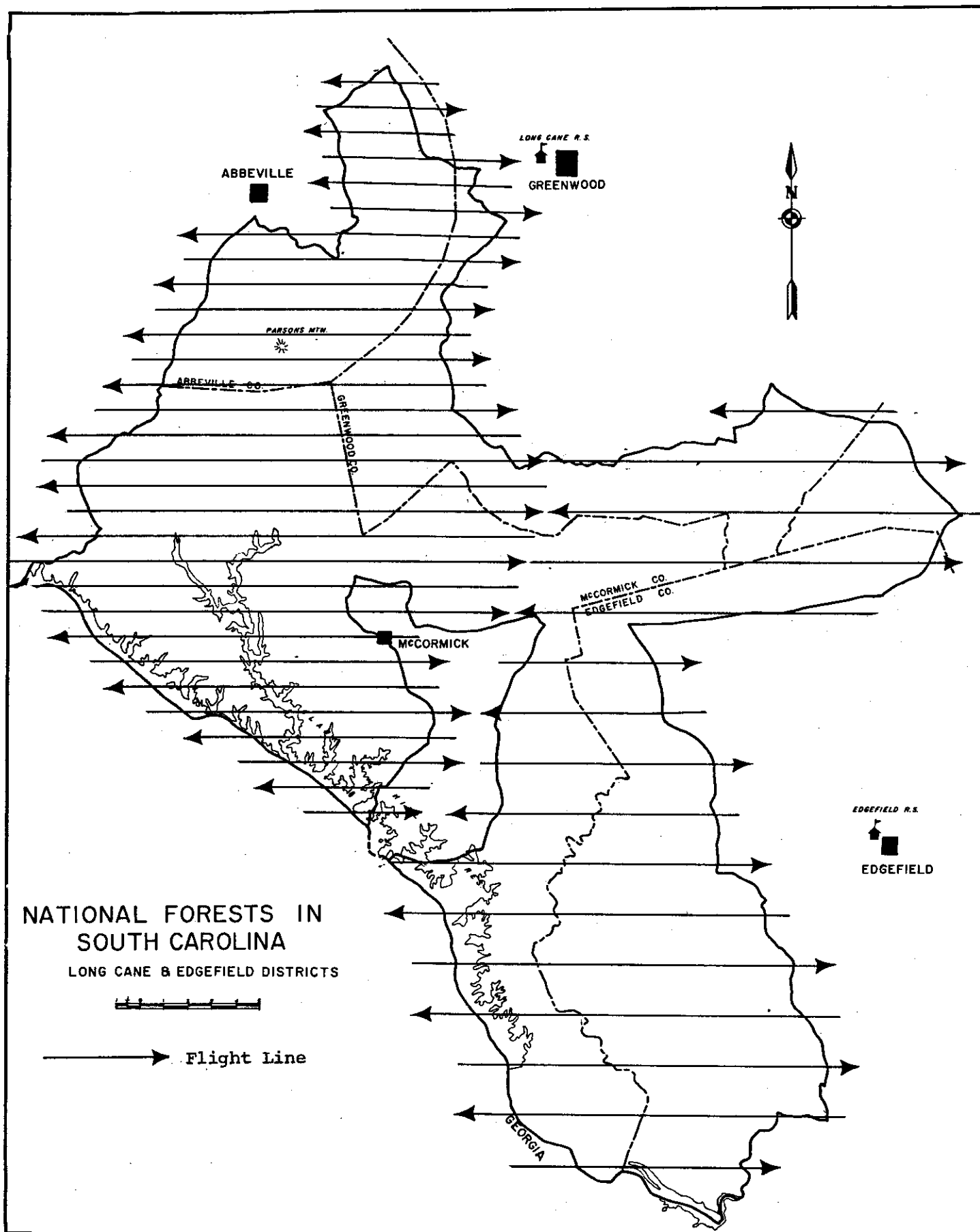


Figure 1. Location of southern pine beetle evaluation, Long Cane and Edgefield Districts. Sumter National Forest, South Carolina, 1974

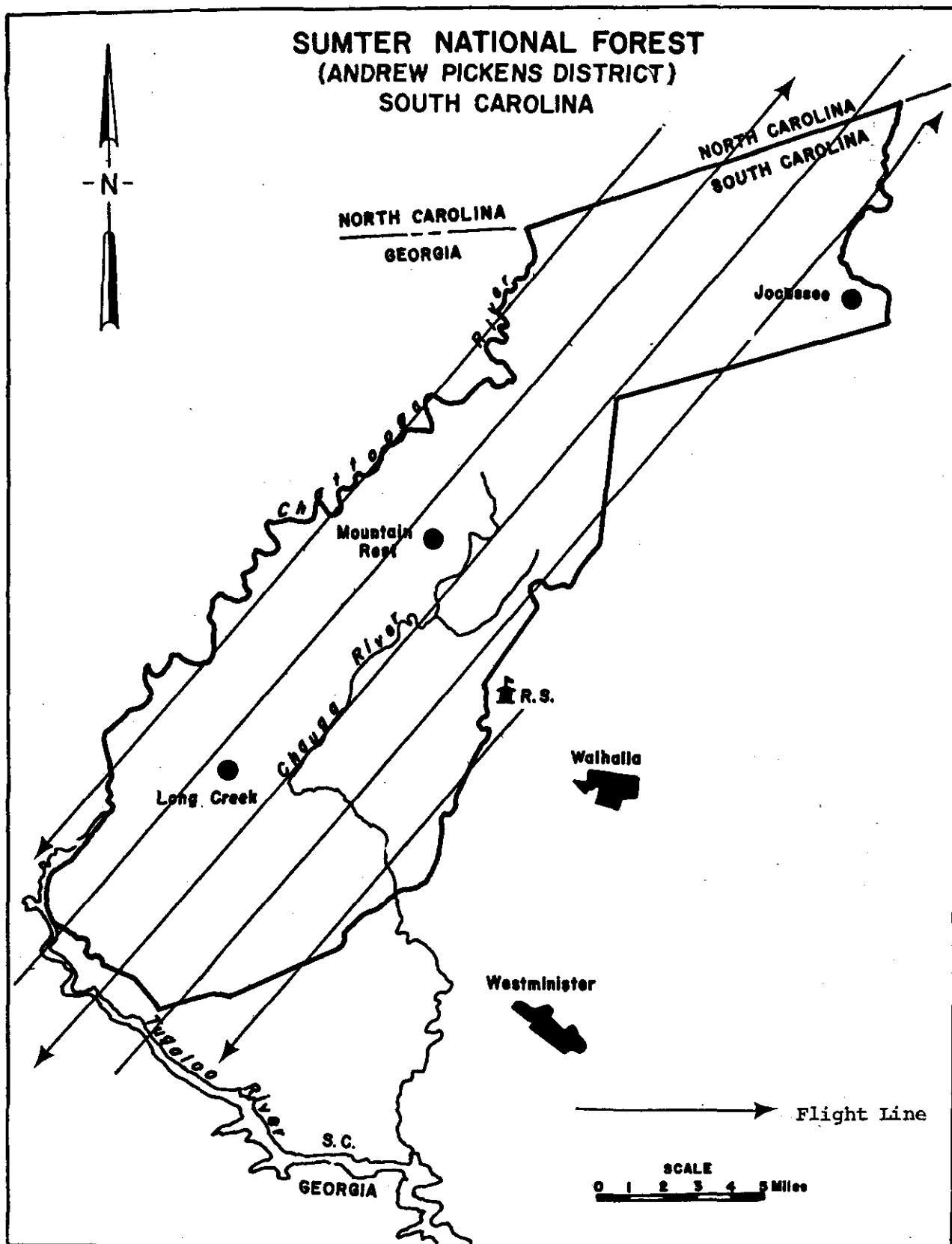


Figure 2. Location of southern pine beetle evaluation, Andrew Pickens District, Sumter National Forest, South Carolina, 1974.

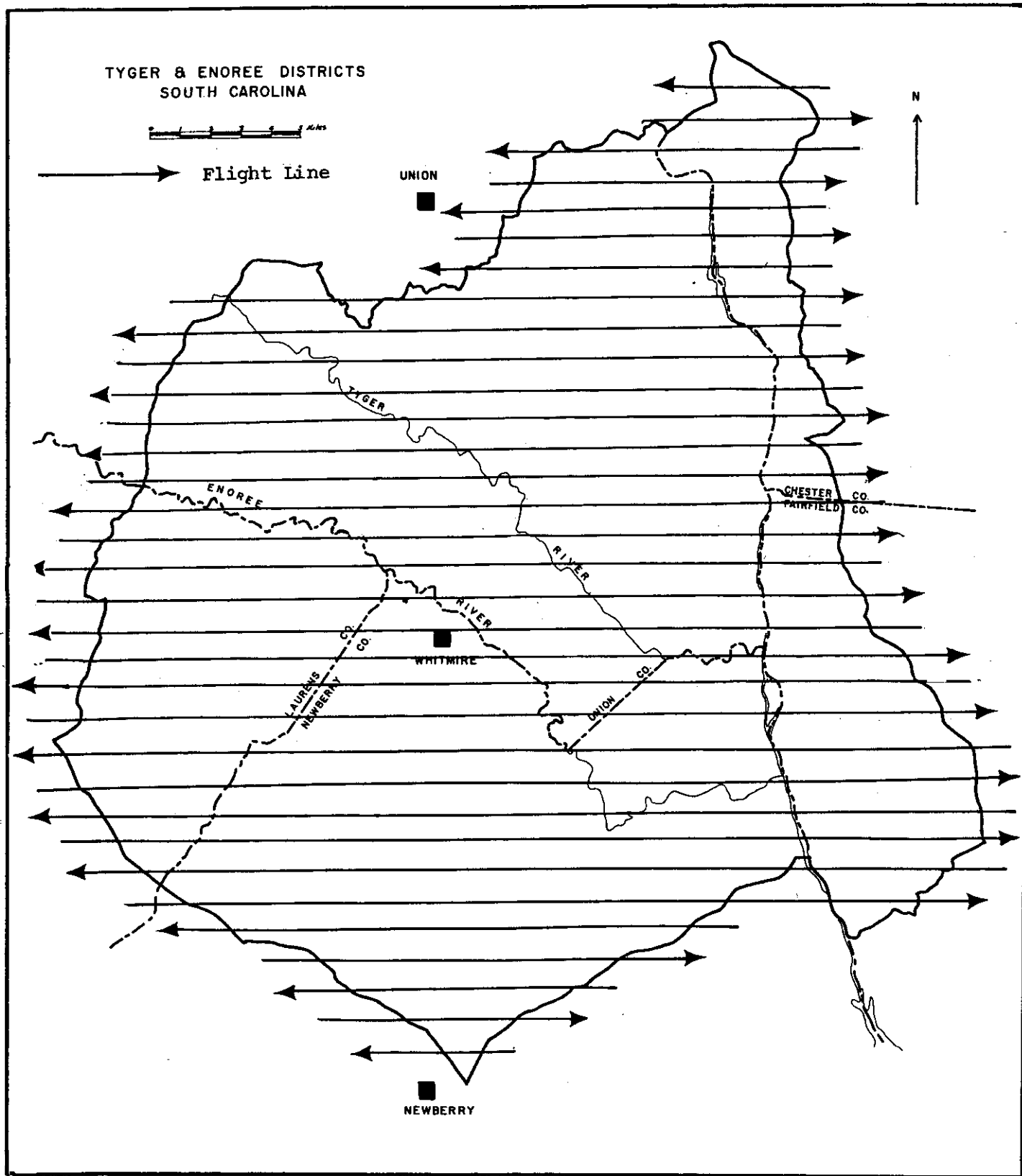


Figure 3. Location of southern pine beetle evaluation, Tyger and Enoree Districts, Sumter National Forest, South Carolina, 1974.